Claims:

1 – 15 (canceled)

16. (currently amended) A method of combusting a fuel in a catalytic combustion system, comprising:

providing a catalytic burner comprising a first catalytic element disposed in a first flow path, the first flow path in fluid communication with and disposed upstream ~~with respect to a direction of flow within a primary burner, the primary burner comprising~~of an annular flow channel disposed in a primary burner;

pre-reacting fuel supplied by a burner fuel supply in a catalytic pre-reaction by exposing the fuel to the first catalytic element;

directing the pre-reacted fuel from the first flow path ~~into~~ onto an inner surface of an outer wall that defines an outer perimeter of the annular flow channel ~~along a direction comprising a component tangential to the first flow path~~ such that inner surface of the annular flow channel outer wall is effective to impart a circumferential motion to the pre-reacted fuel in the annular flow channel, causing the pre-reacted fuel to flow in a helical flow path in the annular flow channel; and

continuing to burn the pre-reacted fuel in a secondary reaction located in the primary burner located downstream of the pre-reaction.

17. (previously presented) The method as claimed in claim 16, wherein the secondary reaction occurs in the vortex.

18. (previously presented) The method as claimed in claim 17, wherein the combined length of the catalytic burner, primary burner and combustion space are determined based on a dwell time of the pre-reacted fuel.

19. (currently amended) The method as claimed in claim 18, wherein thc catalytic burner, primary burner and combustion space are arranged next to each other in sequence along the annular flow channel longitudinal axis..

20. (previously presented) The method as claimed in claim 19, wherein the secondary reaction is a homogeneous non-catalytic reaction.

21. (previously presented) The method as claimed in claim 20, wherein the fuel is completely burned in the secondary reaction.

22. (previously presented) The method as claimed in claim 21, wherein the dual gas/liquid fuel is either a fuel gas or a fuel oil.

23. (previously presented) The method as claimed in claim 22, wherein the fuel is a fuel gas during a first operating mode of the catalytic combustion system and is a fuel oil during a second operating mode catalytic combustion system.

24. (currently amended) A burner for burning a fuel, comprising:

a primary burner comprising ~~an annular~~ a primary flow channel, wherein the primary flow channel comprises ~~an annular~~ a primary flow channel outlet; and

a catalytic burner comprising a catalytically effective element disposed in a catalytic burner flow channel, the catalytic burner flow channel arranged to direct pre-reacted fuel onto an inner surface of an outer wall that defines an outer perimeter of the flow channel ~~into the primary flow channel along a direction tangential to the primary flow channel~~ via a catalytic burner fuel outlet such that the inner surface of ~~a~~ the primary flow channel outer wall imparts circumferential motion to the pre-reacted fuel effective to create a vortex in the primary flow channel, wherein the fuel is catalytically pre-reacted via exposure to the catalytically effective element.

25. (previously presented) The burner as claimed in claim 24, wherein the fuel is a fuel gas during a first operating mode of the catalytic burner and is a fuel oil during a second operating mode of the catalytic burner.

26. (currently amended) The burner as claimed in claim 25, wherein the burner comprises a plurality of primary flow channels each sharing a common longitudinal axis, a catalytic burner for each primary flow channel, at least one catalytically effective element per catalytic burner, and a respective inner surface of each primary flow channel respective outer wall imparts circumferential motion to the pre-reacted fuel effective to create a vortex about the common longitudinal axis.

27. (previously presented) The burner as claimed in claim 26, wherein the catalytically effective element is a honeycomb catalytic converter.

28. (previously presented) The burner as claimed in claim 27, wherein the honeycomb catalytic converter basic component is selected from the group consisting of titanium dioxide, silicon oxide and zirconium oxide.

29. (previously presented) The burner as claimed in claim 28, wherein the honeycomb catalytic converter catalytically active component is a noble metal or metal oxide which has an oxidizing effect on the fluid fuel.

30. (canceled)

31. (currently amended) The burner as claimed in claim 26, wherein the catalytically effective elements that pre-react fuel directed into a respective primary flow channel are arranged in a plane perpendicular to the common longitudinal axis.

32. (previously presented) The burner as claimed in claim 31, wherein the combined length of the catalytic burner, primary burner and flow channel are determined based on a dwell time of the pre-reacted fuel.

33. (previously presented) The burner as claimed in claim 32, wherein the catalytic burner, primary burner and flow channel are arranged next to each other in sequence along the common longitudinal axis..

34. (currently amended) A combustion chamber for a gas turbine engine, comprising:

a combustion chamber housing having an inward side and an outward side;

a combustion chamber wall formed on the inward side of the combustion chamber;

a plurality of heat resistant elements affixed to an interior of the combustion chamber wall that define a combustion air flow channel;

a primary burner having a first annular flow channel comprising a first annular outlet and a second annular flow channel concentric with and surrounding the first annular flow channel and comprising a second annular outlet, wherein the first and second annular flow channels comprise a common longitudinal axis and are separated by a common annular wall;

a first catalytic burner comprising: a first catalytic burner flow channel; a first catalytically effective element disposed in the first catalytic burner flow channel; and a first outlet arranged to direct a ~~first~~ flow of a first fuel onto an inner surface of the common annular wall that defines an outer perimeter of ~~tangentially into~~ the first annular flow channel, such that the inner surface of ~~a~~the common annular ~~first annular flow channel outer~~ wall is effective to impart circumferential motion to the first flow and create a vortex in the first annular flow channel about the common longitudinal axis, wherein the first fuel is catalytically pre-reacted by exposure to the first catalytically effective element; and

a second catalytic burner comprising: a second catalytic burner flow channel; a second catalytically effective element disposed in the second catalytic burner flow channel; and a second outlet arranged to direct a ~~second~~ flow of a second fuel onto an inner surface of an of an outer wall that defines an outer perimeter of ~~tangentially into~~ the second annular flow channel, such that the inner surface of the~~a~~ second annular flow channel outer wall is effective to impart circumferential motion to the second flow and create a vortex in the second annular flow channel about the common longitudinal axis, wherein the second fuel is catalytically pre-reacted by exposure to the second catalytically effective element, and

wherein subsequently a homogeneous non-catalytic secondary reaction is ignited downstream of the primary burner fuel outlet.

35. (previously presented) The combustion chamber as claimed in claim 34, wherein the fuel is either a fuel gas or a fuel oil.